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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/773,886	02/06/2004	Bruno Ullrich	BOW1335-046A	7466

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EXAMINER	
PHAM, THANHHA S	
ART UNIT	PAPER NUMBER
2813	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/11/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/773,886	ULLRICH ET AL.	
	Examiner	Art Unit	
	Thanhha Pham	2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 April 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-59* is/are pending in the application.

4a) Of the above claim(s) *3,12-16,27 and 34-59* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4-10,17-26 and 28-33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *2/6/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

This Office Action is in response to Applicant's Amendment date d01/16/2007.

Information Disclosure Statement

1. The information disclosure statement filed 2/26/2004 fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 because the list of documents does not include a column that provides a space, next to each document to be considered, for the examiner 's initials. It has been placed in the application file, but the information referred to therein has not been considered as to the merits. Applicant is advised that the date of any re-submission of any item of information contained in this information disclosure statement or the submission of any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the statement, including all certification requirements for statements under 37 CFR 1.97(e). See MPEP § 609.05(a).

2. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609.04(a) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-2, 4-10, 17-26, 28-33, as being best understood, are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Haruta et al [US 6,110,291].

► With respect to claims 1-2 and 6, Haruta et al (abstract, figs 1-149, cols 1-90) discloses a method of laser deposition of a layer of gallium arsenide (124, fig 20) upon a silicon substrate (123), said method comprising the steps of:

(a) providing in a vacuum (vacuum in chamber 122, fig 120):

(1) a target (target 5 in chamber 122, fig 120, cols 76-77, particularly the 78th embodiment) comprising a target surface bearing gallium arsenide; and

(2) a substrate comprising a substrate surface (123, in chamber 122, fig 120, cols 76-77, particularly the 78th embodiment) bearing silicon;

wherein said target surface and said substrate surface are in opposed alignment and in substantially parallel alignment; and

(b) irradiating said gallium arsenide (of target 5 in chamber 122) with a laser with sufficient power so as to explosively vaporize said gallium arsenide and cause said gallium arsenide (124) to be deposited upon said silicon (123) uniformly and in substantially stoichiometric ratio.

► With respect to claims 4-5 and 25-26, Haruta et al (abstract, figs 1-149, cols 1-90) discloses a method of laser deposition of a layer of gallium arsenide (124, fig 20) upon a silicon substrate (123), said method comprising the steps of:

(a) providing in a vacuum (vacuum in chamber 122, fig 120):

(1) a target (target 5 in chamber 122, fig 120, cols 76-77, particularly the 78th embodiment) comprising a target surface bearing gallium arsenide; and

(2) a substrate comprising a substrate surface (123, in chamber 122, fig 120, cols 76-77, particularly the 78th embodiment) bearing silicon;

wherein said target surface and said substrate surface are in opposed alignment and in substantially parallel alignment; and

(b) irradiating said gallium arsenide (of target 5 in chamber 122) with a laser of sufficient laser fluence so as to cause said gallium arsenide (124) to be explosively vaporized and deposited upon said silicon (123) uniformly and in substantially stoichiometric ratio, wherein limitation of "wherein said layer of gallium arsenide deposited upon said silicon has a smoothness variation of less than 20 nm" is considered to involve optimization experiment. The claimed range of smoothness variation is considered to involve routine optimization while has been held to be within the level of ordinary skill in the art. As noted in In re Aller 105 USPQ233, 255 (CCPA 1955), the selection of reaction parameters such as temperature and concentration would have been obvious.

"Normally, it is to be expected that a change in temperature, or in concentration, or in both, would be an unpatentable modification. Under some circumstances,

however, changes such as these may be impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art...such ranges are termed "critical ranges and the applicant has the burden of proving such criticality... More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation."

See also In re Waite 77 USPQ 586 (CCPA 1948); In re Scherl 70 USPQ 204 (CCPA 1946); In re Irmscher 66 USPQ 314 (CCPA 1945); In re Norman 66 USPQ 308 (CCPA 1945); In re Swenson 56 USPQ 372 (CCPA 1942); In re Sola 25 USPQ 433 (CCPA 1935); In re Dreyfus 24 USPQ 52 (CCPA 1934).

► With respect to claims 7, 9, 11, the target surface of Haruta et al (cols 76-77, particularly the 78th embodiment) would consisting essentially of substantially pure gallium arsenide.

► With respect to claims 8 and 10, the substrate surface of Haruta et al (cols 76-77, particularly the 78th embodiment) would consisting essentially of substantially pure silicon.

► With respect to claims 17-18, the claim ranges of distance and applied laser fluence is considered to involve routine optimization while has been held to be within the level of ordinary skill in the art. *See In re Aller 105 USPQ233, 255 (CCPA 1955), In re Waite 77 USPQ 586 (CCPA 1948); In re Scherl 70 USPQ 204 (CCPA 1946); In re Irmscher 66 USPQ 314 (CCPA 1945); In re Norman 66 USPQ 308 (CCPA 1945); In re*

Swenson 56 USPQ 372 (CCPA 1942); In re Sola 25 USPQ 433 (CCPA 1935); In re Dreyfus 24 USPQ 52 (CCPA 1934).

► With respect to claims 19-24 and 28-33, Haruta et al discloses moving/rotating the target surface and/or the substrate surface in different directions including direction as be claimed to control uniformity and quality of deposited layer. (see figs 32, 33A-33B, 55, 58, 65, 100-101, 116 and related for details)

Response to Arguments

4. Applicant's arguments filed 01/18/2007 have been fully considered but they are not persuasive.

► With respect to Applicant's argument on pages 14-15, Applicant argues that Haruta et al does not teach or suggest the method of the present of invention since plume intensity of Haruta et al does not cause gallium arsenide explosively vaporized and deposited upon said silicon uniformly. The argument is not persuasive since Haruta et al teaches explosively vaporizing gallium arsenide by irradiating laser to the target 5 (fig 120) of gallium arsenide in chamber 122 [*formation of plume 15 from target 5 is caused by explosively evaporizing material from target 5*] that causes gallium arsenide deposited upon said silicon in substantially stoichiometric ratio (cols 76-77, 78th embodiment) wherein the gallium arsenide being deposited uniformily and inherenly with a smooth thickness -- since the purpose of Haruta et al teaching is to use laser for depositing thin film with uniformity quality and uniform film thickness. In addition, Haruta et al sees effect of laser fluence (col 23 lines 37-59) and positions of substrate and targets (col

33) can be used to control to the uniformity of deposited film. Therefore, the claimed range of distance between the target surface and the substrate surface and the claimed range of applied laser fluence are considered to involve routine optimization while has been held to be within the level of ordinary skill in the art since Applicant's specification does not show criticality and such claimed ranges and unexpected results. Based on what being mentioned, claims stand as rejected above.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Ullrich et al ["Preparation of thin film GaAs on glass by pulsed-laser deposition", Photon Processing in Microelectronics and Photonics II, Proceedings of SPIE, Vol 4977 (2003), pp180-187] shows depositing GaAs by irradiating laser with laser fluence of 0.79-084 J/cm2 and distance between the substrate silica glass surface and the target substrate of 6 cm.

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanhha Pham whose telephone number is (571) 272-1696. The examiner can normally be reached on Monday and Thursday 9:00AM - 9:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TSP

THANHHA S. PHAM
PRIMARY EXAMINER